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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/920,935	08/03/2001	Shune-Shing Hsiao	HSIA3007/EM/7105	8802

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EXAMINER

JONES, JUDSON

ART UNIT PAPER NUMBER

2834

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/920,935

Applicant(s)

HSIAO, SHUNE-SHING

Examiner

Judson H. Jones

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the ragged strips recited in claim 5 must be shown or the feature(s) canceled from the claim(s). Also the heat sink compound filling spaces in between conductive wires of the coils as recited in claims 10 and 11 must be shown or the feature(s) canceled from the claim(s). See Liebman et al. figure 2 for a drawing of conductive wires that have spaces for a heat sink compound. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear terms used in the specification are: "The present invention relates to a coreless type linear motor, especially about the one having better heat dissipation effect." "The method not only adds the contact area between the coils of the rotor of the motor and air, but also adds the effect of heat dissipation of coils due to avoiding that the insulating substance isolates thermal conduction." "The heat pipe is usually made of metal having good thermal conductivity to make heat can be conducted along the heat pipe."

See also the abstract, which includes terms that are not clear, concise and exact.

Claim Rejections - 35 USC § 112

Claims 2-5, 7-11 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The material for the rotor plate is not specified in the text. Without some indication of the rotor plate material and the thermal conductivity of that material, a person of ordinary skill in the art would not be able to choose a proper heat sink compound or heat pipe material in order to increase the heat dissipation of the device. On page 2 line 3 Applicant refers to US patent 5,703,418 which has Assa as the inventor. See Assa column 2 lines 25-32 for a teaching of TeflonTM or other plastic to be used as rotor plate material. Chitayat column 2 lines 19-23 refers to flat coils encapsulated in a block of epoxy. Takei in column 5 line 64 mentions a coil substrate and in column 6 lines 22-37 mentions spacers and coupling portions of synthetic resin or steel which are then molded with synthetic resin. Since Applicant made a reference to Assa who teaches plastic and since the prior art teaches using synthetic materials for rotor bases, the specific recitation of such a material for Applicant's rotor base will not be viewed as the introduction of new matter.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 6 depends on claim 1 and recites the limitation "said first and second coils of said first and second plate" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim. Claim 1 recites a first rotor comprising a first plate and a first polarity of coils. No

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second plurality of coils and no second plate having coils are mentioned. While Claim 2 recites a second plate and a second plurality of coils, claim 2 is not a part of claim 6.

Claim 7 recites the limitation "said heat sink compound" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 7 depends on claim 6 which in turn depends on claim 1. There is no language in claims 1 or 6 concerning heat sink compound.

Claim 8 depends on claim 2 and recites the limitation of "said first and second coils of said first and second plate." There is insufficient antecedent basis for this limitation in the claim. Claim 2 only recites a second plurality of coils, not first coils, and only recites a second plate.

Claim 10 depends on claim 1 and recites the limitations of "said first and second coils" and "said heat sink compound." There is insufficient antecedent basis for these limitations in the claim. Claim 1 only recites a first plurality of coils, not second coils, and does not recite a heat sink compound.

Claim 11 depends on claim 2 and recites the limitation of "said first and second coils." There is insufficient antecedent basis for this limitation in the claim. Claim 2 only recites a second plurality of coils, not first coils.

Claim 2 recites a second linear motor, a second rotor, a second stator and so on. There is no mention of a first stator, a first rotor or a first stator except in claim 1. Since claim 2 is an independent claim, the language of claim 1 is irrelevant to claim 2. The word "second" in claim 2 should only be used to follow the word "first." Claim 3 refers back to claim 2 and recites "said second heat pipes." If the language in claim 2 is changed, the language in claim 3 will also need to be changed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Korenaga et al. 6,037,680 in view of Takei 5,565,718. Korenaga et al. discloses in figure 19B a linear motor having a movable member and a stator with a coil plate 71 between guide plates 66 having magnets 67, the coil plate having a plurality of coil troughs with the coils buried within said troughs and having the center of the coils open, thus allowing the conduction of heat from the coils. Korenaga et al. does not disclose the coil plate being movable. However Takei teaches movable coils in column 10 lines 11-16. Movable coil embodiments are often lighter than moving magnet embodiments but require flexible coil connections that can break or require brushes that can wear out. Since Korenaga et al. and Takei are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a movable coil embodiment for a linear motor having a movable member and a stator with a coil plate between guide plates having magnets, the coil plate having a plurality of coil troughs with the coils buried within said troughs and having the center of the coils open, thus allowing the conduction of heat from the coils.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Korenaga et al. in view of Takei and Chitayat 5,723,917. Korenaga et al. discloses in figure 19B a linear motor having a movable member and a stator with a coil plate 71 between guide plates 66 having magnets 67, the coil plate having a plurality of coil troughs with the coils buried within said

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troughs and having the center of the coils open, thus allowing the conduction of heat from the coils. Korenaga et al. does not disclose the coil plate being movable or a heat sink compound filling the center of the coils. However Takei teaches movable coils in column 10 lines 11-16. Movable coil embodiments are often lighter than moving magnet embodiments but require flexible coil connections that can break or require brushes that can wear out. Since Korenaga et al. and Takei are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a movable coil embodiment for a linear motor having a movable member and a stator with a coil plate between guide plates having magnets, the coil plate having a plurality of coil troughs with the coils buried within said troughs. In regard to filling the centers of the coils with a heat sink compound, see Chitayat column 5 lines 27-43 and see figure 3, which shows anchors 66 in the center holes of the coils. Since Chitayat and Korenaga et al. as modified by Takei are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a heat sink compound for the purpose of providing structural integrity to the coils.

Claims 3-5, 8, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korenaga et al. as modified by Takei and Chitayat as applied to claim 2 above, and further in view of Liebman et al. 6,262,501 B1. Korenaga et al. as modified by Takei and Chitayat discloses the coreless motor having a heat sink compound filled into heat holes but does not disclose a plurality of heat pipes buried in the heat holes. However Liebman et al. teaches using heat pipes in a linear motor in column 5 line 65 to column 6 line 4 in order to improve the heat dissipation. Since Liebman et al. and Korenaga et al. as modified by Takei and Chitayat are both

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from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized heat pipes in order to improve the heat dissipation of the coils and thus increase motor efficiency and also extend the life of the motor.

In regard to claim 4, see Liebman et al. figure 6 element 32.

In regard to claim 5, Korenaga et al. as modified by Takei and Chitayat discloses the coreless linear motor but does not disclose the contact surface between the heat sink compound and the air having a plurality of ragged strips to increase thermal conduction effect. However Liebman et al. teaches in column 1 lines 54-58 that increasing the surface area of an element to be cooled increases the cooling effect of ambient air and specifically mentions fins as one way to do this. Fins are viewed as being the same thing as strips. Making the fins irregular or ragged would be another way of increasing the surface area of the element to be cooled. Since Liebman et al. and Korenaga et al. as modified by Takei and Chitayat are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized irregular fins in the coreless linear motor in order to improve the heat dissipation of the coils and thus increase motor efficiency and also extend the life of the motor.

In regard to claim 8, see Liebman et al. column 8 line 63 to column 9 line 3.

In regard to claim 9, see Liebman et al. column 6 lines 11-19. Liebman et al. places a comb as well as heat sink compound into the holes in order to better dissipate heat.

In regard to claim 11, see Liebman et al. column 8 line 63 to column 9 line 3.

Claims 6, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korenaga et al. as modified by Takei as applied to claim 1 above, and further in view of Liebman

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et al. Korenaga et al. as modified by Takei discloses the coreless linear motor but does not disclose heat dissipation holes set near the coils of the device. However Liebman et al. discloses heat dissipation holes in column 4 lines 5-10. Since Liebman et al. and Korenaga et al. as modified by Takei are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized heat dissipation holes in the coreless linear motor in order to improve the heat dissipation of the coils and thus increase motor efficiency and also extend the life of the motor. See Liebman et al. column 1 lines 59-67 for a teaching of placing heat dissipation holes next to the inner-most or outer-most wires.

In regard to claim 7, see Liebman et al. column 6 lines 11-19. Liebman et al. places a comb as well as heat sink compound into the holes in order to better dissipate heat.

In regard to claim 10, see Liebman et al. column 8 line 63 to column 9 line 3.

Any inquiry concerning this communication should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ *[Signature]*
November 30, 2002

Judson Jones
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